

# EXECUTIVE ORDER S 20-04 BENCHMARKING WHITE PAPER

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**STAFF WHITE PAPER**

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MARCH 2005  
CEC-400-2005-010

## **Executive Order S 20-04 Benchmarking White Paper**

Governor Schwarzenegger's Executive Order (EO) S 20-04 focuses on the commercial building sector in California. Additionally, state agencies and departments that own and operate facilities were given specific goals and assignments. Other State agencies such as the Energy Commission and the California Public Utilities Commission (CPUC) were assigned certain tasks that would facilitate implementation of these goals. The overarching goal of the EO is to cause a 20% reduction of wasteful energy consumption in this sector by 2015, using 2003 as the reference.

The EO, supported by the more detailed Green Building Action Plan (GBAP), directs various state entities to develop and implement certain actions/measures. One of these is benchmarking.

- 2.2.2. The CEC, in consultation with other governmental agencies, public and private utilities, and representatives of the business community, shall propose by July 2005 a simple building efficiency benchmarking system for all commercial buildings in the State. This should be California-specific, coordinated with the US EPA Energy Star benchmarking system, and should clarify which buildings are energy efficient.*
- 2.2.3. The CEC shall prepare and submit to the Governor's office by July 2005 a plan, timetable and recommendations to accomplish benchmarking of all commercial and public buildings in California, including benchmarking at the time of sale, as well as a system by which benchmarking ratings can be disclosed to tenants, buyers, and lenders to advise them in making decisions.*

The purpose of this Staff Workshop is to consult with the stakeholders identified in the Green Building Action Plan (or GBAP) and interested members of the public on the topic of benchmarking.

To this end we have identified a number of issues on which we would like to obtain feedback. We are also interested in receiving input on any other issues regarding benchmarking that we may have overlooked.

Participants will have an opportunity to share their points of view at the workshop. Because time is often a limitation in these forums, in addition to verbal participation, stakeholders are encouraged to submit written comments to:

California Energy Commission  
Attn: Al Garcia /GBI Benchmarking Workshop  
1516 9<sup>th</sup> Street, MS 42  
Sacramento, CA 95814

## **Target Population**

The Energy Commission estimates there are approximately 800,000-1,000,000 commercial buildings in California. These buildings range from a few hundred square feet to millions of square feet each. Building types range from small neighborhood quick markets to high rise office buildings, university campuses, correctional institutions and multi-store shopping centers. Building ownership includes owner occupied premises, fleets of buildings owned by private and corporate owners and state owned/leased facilities.

Most facilities are individually metered but some, such as university campuses and many large commercial buildings are master-metered. The extent to which master metering is practiced is unknown.

### **Questions:**

With the above as a background, utilities are requested to take a first cut at characterizing the commercial market in their service territories.

1. Who are the customers for benchmarking?
2. What is the composition of the commercial sector within each utility service territory (e.g. building type, ownership, business activities)?
3. How would such a difference impact the way that benchmarking information would be delivered?
4. What delivery mechanisms are most appropriate for these different building types, owners, and business activities?
5. What are the attributes of customers that would indicate willingness to implement energy efficiency (EE) measures? Size? Capacity? SIC? End use? Ownership?

## **Benchmarking Approaches**

There are multiple approaches to benchmarking the energy performance of buildings. The most well-known type is a “peer-group” benchmark, where one building is compared to a sample of comparable buildings by type and climatic region.

Conceptually, we can understand that facilities may differ in energy use intensities depending on their business activities. For instance, a computer server farm will have a very different EUI than a warehouse, an office building or a grocery store, so it is usually useful to compare facilities by their business activity or building type so that buildings are compared to their own peer group.

Buildings within one peer group may differ significantly in size. A straight comparison of energy bills would not be very useful for determining which facility uses more energy. The most common way (but not the only way) to make such a comparison is to express annual energy usage on a per square feet basis. This “normalized” energy use is called the Energy Use Intensity (EUI). The EUI is often expressed in terms of kBtu/ft<sup>2</sup>-yr or kWh/ft<sup>2</sup>-yr. Similarly, a normalized annual energy cost comparison would be represented in \$/ft<sup>2</sup>-yr.

In order to put the resulting EUI in context, it is useful to compare it to a statistically representative sample of similar buildings. U.S. EPA's national benchmarking tool is the Energy Star Portfolio Manager, which includes energy use data from over 50,000 buildings from all over the nation. CalArch is a prototype benchmarking tool for CA buildings that was developed by LBNL as an R&D project with PIER's Building Energy Efficiency Program, and uses CA-specific building characteristics and energy use data.<sup>1</sup> There are several other peer-group benchmarking tools and approaches that have been developed around the nation as part of specific energy efficiency programs (e.g. U.S. EPA & DOE's Labs21 for laboratory buildings and FSEC's Utility Report Card for schools). Each of these approaches benchmarks against different populations of buildings and each have different data input requirements.

Another type of benchmarking that has value is comparing the energy usage information for one building over a particular time period recorded by the utility. All utilities include the commodity consumed (therms, kwh) as well as the amount of money this consumption represents. The consumer could compare this information over time to subsequent energy bills to get a sense of whether the energy consumption for the facility is increasing or decreasing.

Although simple, this approach has some technical deficiencies. Utility meters are not always read over the same interval. Usually this interval is 30 days, but in actual practice can vary by a couple of days each month. To make the billing information more meaningful for the simple benchmarking exercise, the consumption information should be adjusted to reflect the same number of days for each reading.

As long as operating hours remain fairly constant from period to period this measure is a useful benchmark. Consider however, a change in operating hours, from eight hours per day, five days per week to 10 hours per day, seven days per week. Such a change could introduce a significant change in the measure and needs to be recognized.

Weather can also introduce large deviations in energy use. For instance, summertime energy use is quite different from wintertime usage. California has 16 discrete weather zones; energy consumption can vary radically from one zone to another for similar operating hours and end uses.

Finally, a benchmarking approach could compare the energy use of building components, or "end-uses", in addition to the whole building comparisons. For example, separate EUIs could be calculated for lighting, HVAC, process equipment and plug load, then compared to a representative levels of efficiency for each of these end uses. This approach could be useful to facility managers or building owners who want more information on which to make a decision about investing in energy efficiency improvements. This approach also requires that much more information be collected for each building being benchmarked.

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<sup>1</sup> For more information on these two benchmarking approaches, please see: Matson and Piette, Review of National and California Benchmarking Methods, March 2005, Lawrence Berkeley National Laboratory.

Questions:

1. Who needs benchmarking? Who are the customers for this information?
2. What do the customers want?
3. Which benchmarking approaches are appropriate for us to consider?
4. What is cost-effective to provide?
5. What are the trade-offs of a detailed benchmark tool vs. a “screening level” benchmark tool?
6. What are the implementation impacts of one approach vs. the other-in terms of resources, cost, results, measures and practices implemented?
7. Is there a value to a phased approach where an initial “screening level” benchmark is followed up by a more detailed study or being able to “drill down” and obtain more detailed benchmarking information by providing more detailed operating and end-use information?
8. What are the benefits of using a “nationally branded” algorithm?
9. What attributes should characterize a Benchmarking tool?
  - Convenient
  - Easy to use
  - Meaningful
  - Provides right signal
  - Provides proper motivation
  - Other attributes?

### **Marketing and Implementation of Benchmarking**

Once benchmarking tools are selected, facility specific information needs to be collected and input to the algorithm along with the energy usage information. The resulting data needs to be communicated to the owner/operator in order for some reaction to result.

Indications are that this data needs to be communicated with other programmatic information to motivate the owner/operator to take the desired EE actions. This programmatic information could include commissioning programs, energy audits, financing programs, training and rebates.

One implementation issue is concern over customer energy data confidentiality. In general, utilities believe that they have an obligation to maintain the confidentiality of such data and that they can not release such information to third parties without a legal release from the customer. There may also be concerns about releasing energy use information that may be considered confidential and/or competitive in certain situations..

Questions:

1. What steps can be taken to preserve customer confidentiality and competitive information?
2. How would you go about collecting/inputting the facility specific information?
3. What entity should be responsible for calculating the benchmark? The utility? Third parties? Building owner/operators?

4. What is the best manner of presenting the benchmarking information to the customer? Webpage? Unique mailing? E-mail or bill insert? Printed on bill? Presentation/visit by utility/service company representative? Other?
5. What would be the best manner to utilize the benchmarking information to motivate the customer to take action?
6. Should this benchmarking system be completely voluntary, or somehow mandated?
7. How can benchmarking be integrated with existing utility and Energy Commission/CPUC programs (energy efficiency, demand reduction, distributed generation, procurement, etc)?
8. How can benchmarking be used to improve follow through by program deliverers and participation by customers?
9. Who (what entity) should provide the benchmarking information at:
  - the screening level?
  - more detailed level?
10. Should customers be prioritized based on the benchmark, i.e. should a customer that ranks as having a high potential for implementing EE be targeted (by the utility) for receiving marketing attention?
11. What are the pros and cons on using a phased approach-where a simple, but reliable benchmark is used to screen customers, followed by a more rigorous benchmark after the customer has been qualified?
12. Let's discuss the marketing benefits of using a benchmarking approach that has a "national brand".
13. How can the private sector participate in:
  - Benchmarking?
  - other energy related marketing opportunities?
14. It is technically feasible to track benchmarking information over time for a customer's facility and to aggregate energy usage and benchmarking information for one or more of a customer's premises?
15. How can the customer be motivated to enter the facility specific information that would be necessary for calculating the benchmark (square feet, operating hours, etc)?
16. Should customers be "qualified" at the screening level before enrolling them in the more detailed benchmark? What are the pros and cons to qualifying customers?
17. What qualifying criteria, if any, should be established? (completeness of screening level info, agreement to meet with utility/ESCO representative, energy consumption, capacity?)
18. How should the benefits of benchmarking be quantified, i.e. measurement & valuation (M&V)?
19. Are there confidentiality/security issues associated with benchmarking?

## **Financial**

There are costs associated with developing and providing customers with benchmarking information. Typically these costs would be passed on to customers through prices or through a Public Goods Charge (PGC).

1. What cost recovery mechanisms would work for:
  - private sector (ESCO's, service & equipment vendors)?
  - Utilities?

- other participants?

**Miscellaneous**

The GBAP requires the Energy Commission to develop and propose a system by which benchmarking ratings can be disclosed to tenants, buyers, and lenders to advise them in making decisions. This topic will require further exploration beyond this workshop, but it would be desirable to receive some preliminary thoughts from stake holders.